October 25, 2002

Alan S. Hanson
President and Chief Executive Officer
Transnuclear, Inc.
Four Skyline Drive
Hawthorne, NY 10532-2176

SUBJECT: NRC INSPECTION REPORT 72-1004/2002-201

Dear Mr. Hanson:

On October 7 through 10, the U.S. Nuclear Regulatory Commission (NRC) performed an announced team inspection at the Transnuclear, Inc. Fremont Operation (TNF) office in Fremont, California. The team inspected TNF's activities associated with spent fuel storage to determine if they were conducted in accordance with the requirements of 10 CFR Part 72 and TNF's NRC-approved quality assurance (QA) program. The team inspected TNF's design controls with specific emphasis on 10 CFR 72.48 evaluations, and on thermal calculations and modeling related to the 32PT DSC (dry shielded canister) currently under NRC licensing review. Follow-up was also performed of TNF's corrective actions to a violation and several weaknesses identified during the previous NRC inspection at TNF, in November of 2000, and documented in Inspection Report 72-1004/00-201.

As a result of the inspection, the team assessed that TNF's procedure for performing 10 CFR 72.48 evaluations was adequate and in conformance with NRC requirements and NRC-endorsed industry guidance. No adverse performance issues were identified in the evaluations reviewed by the team. Design controls for the performance of thermal calculations and modeling for the 32PT DSC were assessed to be adequate and related calculation packages were determined to have been prepared in accordance with TNF's QA program procedures governing design activities. Follow-up actions to the one violation and the weaknesses documented in NRC Inspection Report 72-1004/00-201 were assessed to be adequate and appropriate to the issues.

The team also reviewed thermal modeling assumptions to determine why limiting temperature values predicted by TNF's thermal model for the 32PT DSC are significantly lower than those predicted through the NRC's confirmatory analysis thermal model. As a result of the review, two differences in assumed input variables used in the NRC analysis were identified as potential contributors to the modeling differences. One difference resulted from an incorrect statement in the 32PT DSC Safety Analysis Report; the other difference resulted from having assumed a material property for a material used in the DSC whose specific characteristics had not been fully described in TNF's licensing submittal nor mentioned to NRC staff during discussions about the modeling differences that occurred prior to the inspection. Further confirmatory analyses accounting for the input differences and resolution of any other modeling issues will be conducted through the ongoing 32PT DSC licensing review.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be made available electronically for public inspection in the NRC Public Document Room or from the Publicly Available Records (PARS) component of NRC's document system (ADAMS). ADAMS is accessible from the NRC Web site at http://www.nrc.gov/NRC/ADAMS/index.html (the Public Electronic Reading Room).

Sincerely,
/RA/ original signed by /s/

Michael Tokar, Section Chief
Transportation and Storage Safety and
Inspection Section
Spent Fuel Project Office
Office of Nuclear Material Safety
and Safeguards

Docket 72-1004

Enclosure: NRC Inspection Report
72-1004/2002-201

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Michael Tokar, Section Chief
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Docket 72-1004

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Distribution: Docket 72-1021

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U.S. NUCLEAR REGULATORY COMMISSION
Office of Nuclear Material Safety and Safeguards
Spent Fuel Project Office

Inspection Report

EXECUTIVE SUMMARY

NRC Inspection Report 72-1004/2002-201

On October 7 through 10, the U.S. Nuclear Regulatory Commission (NRC) performed an announced team inspection at the Transnuclear, Inc. Fremont Operations (TNF) office in Fremont, California. The team inspected TNF's activities associated with spent fuel storage to determine if they were conducted in accordance with the requirements of 10 CFR Part 72 and TNF's NRC-approved quality assurance (QA) program. The team inspected TNF's design controls with specific emphasis on 10 CFR 72.48 evaluations, and thermal calculations and modeling related to the 32PT DSC (dry storage cannister) currently under NRC licensing review. Follow-up was also performed of TNF's corrective actions to a violation and several weaknesses identified during the previous NRC inspection at TNF, in November of 2000.

Overall, the team assessed that TNF's procedure for performing 10 CFR 72.48 evaluations was adequate and in conformance with NRC requirements and NRC-endorsed industry guidance. No adverse performance issues were identified in the evaluations reviewed by the team. Design controls for the performance of thermal calculations and modeling for the 32PT DSC were assessed to be adequate and related calculation packages were determined to have been prepared in accordance with TNF's QA program procedures governing design activities. Follow-up actions to the one violation and the weaknesses documented in NRC Inspection Report 72-1004/00-201 were assessed to be adequate and appropriate to the issues.

The team also reviewed thermal modeling assumptions to determine why limiting temperature values predicted by TNF's thermal model for the 32PT DSC are significantly lower than those predicted through the NRC's confirmatory analysis thermal model. As a result of the review, two differences in assumed input variables used in the NRC analysis were identified as potential contributors to the modeling differences. One difference resulted from an incorrect statement in the 32PT DSC Safety Analysis Report; the other difference resulted from having assumed a material property for a material used in the DSC whose specific characteristics had not been fully described in TNF's licensing submittal nor mentioned to NRC staff during discussions about the modeling differences that occurred prior to the inspection. Further confirmatory analyses accounting for the input differences and resolution of any other modeling issues will be conducted through the ongoing 32PT DSC licensing review.

PERSONS CONTACTED

The team held an entrance meeting with TNF on October 7, 2002, to present the scope and objectives of the NRC inspection. On October 10, 2002, the team held an exit meeting with TNF to present the preliminary results of the inspection. The individuals present at the entrance and exit meetings are listed below in Table 1.

Table 1

Entrance and Exit Meeting Attendance

* indicates attended via telephone

NAME	TITLE	AFFILIATION	ENTRANCE	EXIT
Rob Temps	Team Leader	NRC	X	X
Kirke Lathrop	Inspector	NRC	X	X
Paul Narbut	Inspector	NRC	X	X
Jorge Solis	Technical Reviewer	NRC	X	X
Tom Michener	Deputy Group Leader	PNNL/NRC	X	X
Harold Adkins	Sr. Research Engineer	PNNL/NRC	X	X
Alan Hanson	Pres. & CEO	Transnuclear		X *
Bill Gallo	Senior V.P.	Transnuclear	X	X
Bill Sutherland	Director, Corporate QA	Transnuclear	X	X
Bob Grubb	V.P.	Transnuclear	X	X
Miguel Manrique	Structural Engineer	Transnuclear	X	X
Daniel Lacroix	QA Manager	Cogema Logistics	X	X
U.B. Chopra	Licensing Manager	Transnuclear	X	X
Rob Grenier	Consultant	N/A	X	X
Sam Shakir	Dir. Business Dev.	Transnuclear	X	X
Ian Hunter	V.P. Engineering	Transnuclear	X	X
Doug Brown	Consultant	N/A	X	X
S. Christensen	Supv. Doc. Control	Transnuclear	X	X
Tony Chen	QA Manager	Transnuclear	X	X
Slava Gruzeyev	Lead Thermal Eng.	Transnuclear	X	X
Kamran Tavassoli	Thermal Analysis Mng.	Transnuclear	X	X
Usama Farradj	Project Manager	Transnuclear	X	X
Jayant Bondre	Engineering Manager	Transnuclear	X	X
Gregory Banken	Consultant	Q-Metrics		X

Jack Boshoven	Project Manager	Transnuclear		X
Maisoon Khasim	QA Engineer	Transnuclear		X
Dan Kurtz	Consultant	TRIVIS		X
J. Greg Field	President	PacTec		X
Jorge Morales	Dry Fuel Storage Mng.	SCE		X
Dennis Evans	Licensing Engineer	SCE		X
Suzanne Leblang		NMC		X*
Keith Smith		NMC		X*
Dave Morse		NMC		X*

INSPECTION PROCEDURE USED

60851, “Design Control of ISFSI Components”
60857, “Review of 10 CFR 72.48 Evaluations”

LIST OF ACRONYMS USED

CAR	Corrective Action Report
CoC	Certificate of Compliance
DSC	Dry Shielded Canister
NRC	U.S. Nuclear Regulatory Commission
NUHOMS	Nutech Horizontal Modular Storage
QA	Quality Assurance
RA	Required Action
SAR	Safety Analysis Report
TNF	Transnuclear, Inc. Fremont Operation
TNH	Transnuclear, Inc. Hawthorne

REPORT DETAILS

1. Inspection Scope

The team inspected TNF's activities associated with spent fuel storage to determine if they were conducted in accordance with the requirements of 10 CFR Part 72 and TNF's NRC-approved quality assurance (QA) program. The team inspected TNF's design controls with specific emphasis on 10 CFR 72.48 evaluations, and thermal calculations and modeling related to the 32PT DSC (dry shielded canister) currently under NRC licensing review. Follow-up was also performed of TNF's corrective actions to a violation and several weaknesses identified during the previous NRC inspection at TNF, in November of 2000.

2. Design Controls

2.1 Overall Scope

The team examined TNF's design controls to determine whether the design control processes were properly controlled and performed in accordance with procedures. The team's review focused on elements of design development, modification, and the 10 CFR 72.48 change processes.

2.2 Design Controls and Training

2.2.1 Scope

The team reviewed the training and qualifications of personnel responsible for performing calculations and modeling for the 32PT DSC design. The team also reviewed the controls that TNF has in place governing the performance of calculations and modeling.

2.2.2 Findings and Observations

Through a review of training records and personnel interviews, the team examined the qualifications of TNF and TNH (Transnuclear, Inc. Hawthorne) personnel responsible for performing and reviewing thermal calculations and thermal model development for the 32PT DSC design. The team determined that the TNF and TNH personnel involved in this design effort were well qualified to perform their assigned tasks in thermal modeling and calculations. They were familiar with the computer codes being used to validate the 32PT DSC design, and had received specialized training in the ANSYS code. The training records showed that each individual had completed the applicable orientation and work group training required by the QA manual and by the engineering manager.

The team determined that TNF had, as required by their QA program, implemented procedures for the control and administration of the design process. These procedures provided adequate detail for the development, review, approval of and changes to, canister designs, including the 32PT DSC. With regard to calculations used to support a canister design, the team noted that TNF considered such calculations as "preliminary" if unconfirmed or preliminary design input was used. These inputs (or "assumptions" as

termed by TNF) were tracked via the Required Action (RA) system, an electronic system TNF used to identify and track technical, configuration control, and quality issues.

Overall, the team assessed that adequate controls were implemented by TNF for the control of preliminary design inputs and that the RA system provides a useful tool for the tracking and trending of items entered into it.

2.3 Thermal Calculation and Modeling Reviews

2.3.1 Scope

The team reviewed TNF's calculation packages related to the 32PT DSC amendment request and held in-depth discussions with the TNF thermal analysts to resolve questions identified during the calculation package reviews. Thermal modeling inputs and assumptions were also reviewed and discussed. Conformance to TNF administrative controls for calculation development was also verified.

2.3.2 Findings and Observations

The team identified that TNF followed their administrative procedures for development and modification of thermal calculations and for the control of thermal modeling. During their review, the team identified two errors in TNF's safety analysis report (SAR) regarding the 32PT DSC design. Both errors were documented by TNF in Corrective Action Report (CAR) 02.014 and will be addressed through TNF's corrective action system.

The first error involved an SAR figure where the axial profile shown in the figure was different from the profile used in one of the 32PT DSC calculation packages. TNF determined that the correct axial profile was used in the calculation and that the analysis results reported in the SAR were consistent with the calculation and therefore were unaffected. However, TNF stated the SAR figure would need to be corrected to show the correct axial profile.

The second error involved a statement in the SAR that a 15X15 fuel assembly was used as the basis for determining effective fuel conductivity values whereas one of the 32PT DSC calculation packages indicated that a 17X17 fuel assembly was used as the basis for calculating the conductivity values. TNF determined that the SAR results were obtained using a 17X17 fuel assembly even though the SAR stated that the 15X15 fuel assembly was used. TNF stated that the SAR would be corrected to reflect the use of the 17X17 fuel assembly.

The team also had the opportunity to discuss modeling assumptions with respect to the significant temperature differences predicted between TNF's thermal model and NRC's confirmatory analysis that uses a different thermal model code. As a result of the discussions, two differences in assumed input variables for the NRC analysis were identified as potential contributors to the modeling differences. The first difference involved the assumption of the use of a 15X15 fuel assembly based on SAR information; however, as explained in the above paragraph, the SAR was incorrect and should have

stated that a 17X17 fuel assembly was used.

The second difference resulted from having assumed a material property for a material used in the 32PT DSC whose specific characteristics had not been fully described in TNF's licensing submittal nor mentioned to NRC staff during discussions about the modeling differences that occurred prior to the inspection. Absent this specific information, a value was assumed for the material property that was significantly different from that assumed in the TNF model. At the end of the inspection the NRC planned to have the contractor that performed the confirmatory analysis rerun the analysis with the differences accounted for. Continued resolution of any modeling differences will be conducted through the ongoing 32PT DSC licensing review process.

2.4 Design Changes; 10 CFR 72.48 Evaluations

2.4.1 Scope

The team examined TNF's process and procedures for performing design changes to approved cask designs under the provisions of 10 CFR 72.48 for compliance to NRC requirements and for technical adequacy. The team sampled eleven 10 CFR 72.48 screenings and evaluations and reviewed them for conformance to regulations, TNF's procedures, and industry guidance. Additionally, the team reviewed the records of training performed on the 10 CFR 72.48 process for TNF's staff.

2.4.2 Findings and Observations

TNF's QA procedure for implementing the 10 CFR 72.48 process is QP 3-12, "Screening and Safety Evaluation of Changes to Design Documents," Revision 3, dated July 30, 2002. The team assessed that TNF's procedure for performing 10 CFR 72.48 evaluations was adequate and in conformance with NRC requirements and NRC-endorsed industry guidance. The procedure provided sufficient instructions to enable an evaluator to perform proper screenings and to perform full evaluations where required.

The team determined that TNF staff training on the 10 CFR 72.48 process (that became effective to certificate holders in April of 2001) was initially performed through the read and sign process. TNF determined that this was appropriate as the TNF staff was experienced in performing evaluations similar to the 72.48 process as a result of Condition 9 contained in the NUHOMS (Nutech Horizontal Modular Storage) Certificate of Compliance (CoC). Condition 9, which predated certificate holder's ability to perform the 10 CFR 72.48 process, allowed TNF to make certain changes to the CoC without prior NRC approval after an evaluation process. The team noted that TNF had recently provided formalized classroom training, utilizing a contractor, on the 72.48 process. Overall, TNF's training on the 72.48 process was considered to be adequate.

The team reviewed a sample of 10 CFR 72.48 screenings and evaluations performed by TNF. This included recent screenings and evaluations performed since implementation of the revised 72.48 rule in April of 2001, as well as one older Condition 9 evaluation that implemented the use of a liquid neutron shield in the transfer cask. The team assessed that the evaluations were administratively and technically adequate. The team also

assessed that none of the design changes that were evaluated would have required prior NRC approval, including changes such as the addition of a new cask design (24 PT2S&L) and the addition of the liquid neutron shield in the transfer cask.

Overall, the team assessed that TNF's procedure for performing 10 CFR 72.48 evaluations was adequate and in conformance with NRC requirements and NRC-endorsed industry guidance. No adverse performance issues were identified in the evaluations reviewed by the team, and training to the TNF staff on the 10 CFR 72.48 process was assessed to be adequate.

3. Follow-up to Previous Inspection Findings

The team reviewed TNF's corrective actions for a violation and several weaknesses that were documented in NRC Inspection Report 72-1004/00-201, that was issued following the last NRC inspection at TNF in November of 2000. The team reviewed the RAs that TNF issued to address the violation and weaknesses. Documentation supporting the closure of the RAs was also reviewed. The team assessed that TNF's follow-up actions to the one violation and the weaknesses were adequate and appropriate to the nature of the issues.

4. Exit Meeting

On October 10, 2002, at the conclusion of the inspection, the team held an exit meeting with TNF's management to present the preliminary inspection results. TNF's management acknowledged the inspection results presented by the team. Proprietary information was discussed during the exit meeting.